SHORT REPORT

Pseudo-coarctation Following TEVAR in a Young Triathlete

P.O. Myers [a,*], **A. Kalangos** [a], **A. Panos** [b]

[a] Division of Cardiovascular Surgery, Geneva University Hospitals & School of Medicine, Geneva, Switzerland
[b] Division of Cardiac Surgery, Hygeia Hospital, Athens, Greece

Introduction: Thoracic endovascular aortic repair (TEVAR) has become the main treatment of traumatic aortic isthmic rupture. The long-term complications of TEVAR may be more important in a young patient population.
Report: A 33-year-old triathlete who had undergone successful TEVAR for aortic isthmus rupture, was diagnosed with resistant hypertension 6 years later. CT angiography showed stent dislocation mimicking a coarctation. He underwent successful surgical repair.
Discussion: Device collapse is a phenomenon observed after TEVAR for blunt thoracic aorta injury. Current testing of endografts are insufficient for the long lifespan of survivors of traumatic isthmic rupture. This case illustrates this complication.

Article history: Received 28 February 2013, Accepted 24 April 2013
Keywords: TEVAR, Traumatic isthmic rupture, TEVAR complication

INTRODUCTION

Thoracic endovascular aortic repair (TEVAR) has become the main modality for treatment of traumatic aortic isthmic rupture,[1] particularly useful for patients with multiple, severe injuries in whom anticoagulation and extracorporeal support are contraindicated. Patients surviving this lethal trauma are young, and the long-term complications of TEVAR[2,3] may be more important in this patient population who will likely survive for a very long time with an endograft and be at risk over a longer period of time for complications of these stents, provided they survive the initial repair and associated end-organ trauma. We report the management of a late aortic stent dislocation presenting as resistant hypertension in a triathlete.

REPORT

A 27-year-old male triathlete was an urgent admission to another institution after a motor vehicle accident; he was intubated and in shock. The CT scan showed a grade III rupture of the aortic isthmus and was treated urgently with a Gore TAG endograft (W.L. Gore and Associates, Flagstaff, AZ, USA), covering the ostium of the left subclavian artery. He had an uncomplicated postoperative course and was discharged on the fifth postoperative day. At 6 months' follow-up, he underwent a routine computed tomography (CT) scan, which showed a patent endograft with no significant endoleaks and no aneurysmal dilatation of the thoracic aorta or aortic arch. The patient was allowed to resume his usual triathlon training and had regular yearly medical examinations. Five years later, the patient's primary care physician diagnosed new-onset hypertension at rest. Despite an aggressive antihypertensive regimen, it was not possible to control his hypertension. The medical workup for this uncontrolled hypertension was negative. Six years after his initial operation, a follow-up CT-scan of the thoracic aorta demonstrated a dislocation of the proximal part of the endovascular stent, closing the aortic lumen and creating a quasi-closed diaphragm, mimicking an aortic coarctation (Fig. 1). He was referred for surgical repair of this stent dislocation 6 years after his initial TEVAR.

The distal aortic arch was approached through a median sternotomy and right axillary artery cannulation. Under mild hypothermia (28 °C), the aortic arch was opened transversally, proximal to the origin of the left subclavian artery. The stent on the minor aortic arch curvature was dislocated, closing the aortic lumen (Fig. 2). This dislocated stent segment was cut to its lower hemicircumference and up to the beginning of the descending aorta. The cut remnant was fixed against the aortic wall with a sandwich of Teflon felt inside and outside the aorta, and the aortotomy was closed. The postoperative course was uneventful. An early CT scan showed a widely patent aortic arch, isthmus, and descending aorta, and the patient was discharged on the 6th postoperative day.

At 6 months' follow-up, the patient's blood pressure was within normal range without antihypertensive medications, and he resumed training normally. The CT scan showed stability and a favorable result.

DISCUSSION

In a recent meta-analysis, Jonker et al.[4] reported significantly lower mortality and fewer pulmonary complications in the TEVAR group than the surgery group, despite the fact that patients in the TEVAR group had more major injuries. Despite numerous encouraging reports from a large number of publications in favor of TEVAR in the acute phase of

DOI of original article: http://dx.doi.org/10.1016/j.ejvs.2013.05.002
* Corresponding author. P.O. Myers, Division of Cardiovascular Surgery, Geneva University Hospitals & School of Medicine, 4, rue Gabrielle-Perret-Gentil, 1211 Geneva, Switzerland.
E-mail address: patrick.myers@hcuge.ch (P.O. Myers).

http://dx.doi.org/10.1016/j.ejvsextra.2013.04.001

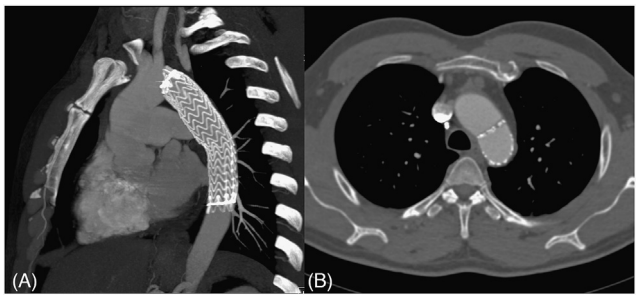

Figure 1. Computed tomographic angiography showing proximal dislocation and near closure of the stent graft. (A) Axial view. (B) Maximum intensity projection sagittal view.

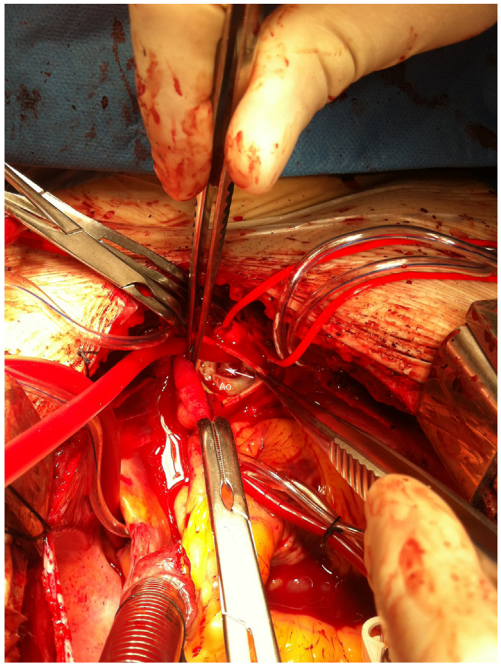

Figure 2. Surgical view at repair, showing the dislocated stent (white arrow) closing the aortic arch lumen. Ao = aortic arch opened longitudinally.

traumatic aortic injuries, there remains a lack of evidence to support an improvement in overall survival compared with traditional surgical treatment. Device collapse is a phenomenon observed in 1–19% of TEVAR repairs for blunt thoracic aorta injury, and is primarily attributable to excessive device oversizing combined with a tight aortic curvature radius.[5] While typically noted within 30 days of treatment, late device collapses have been reported up to 6 years after TEVAR and have been most commonly been reported with the Gore TAG device.

Device durability after TEVAR is another issue in this patient population. Clinical trials of endovascular stent grafts regulated by the FDA typically mandate patient follow-up for 5 years after treatment. Pulsatile fatigue testing of thoracic endografts is generally simulated over 400 million cycles, equivalent to 10 years in vivo. This testing is adequate for the study of thoracic aortic aneurysm, since the typical patient lifespan after TEVAR is 7 years. However, survivors of TEVAR for blunt thoracic aortic injury have an expected lifespan of several decades, and long-term device durability becomes a major concern and current stent graft evaluation methods are likely inadequate.

CONFLICT OF INTEREST/FUNDING

None.

REFERENCES

1 Buz S, Zipfel B, Mulahasanovic S, Pasic M, Weng Y, Hetzer R. Conventional surgical repair and endovascular treatment of acute traumatic aortic rupture. *Eur J Cardio-Thoracic Surg* 2008;**33**(2):143–9.

2 Desai ND, Burtch K, Moser W, Moeller P, Szeto WS, Pochettino A, et al. Long-term comparison of thoracic endovascular aortic repair (TEVAR) to open surgery for the treatment of thoracic aortic aneurysms. *J Thorac Cardiovasc Surg* 2012;**144**(3):604–11.

3 Miller LE. Potential long-term complications of endovascular stent grafting for blunt thoracic aortic injury. *Sci World J* 2012;**2012**:1–5.

4 Jonker FH, Schlosser FJ, Geirsson A, Sumpio BE, Moll FL, Muhs BEJ. Endograft collapse after thoracic endovascular aortic repair. *Endovasc Ther* 2010;**17**(6):725–34.

5 Tadros RO, Lipsitz EC, Chaer RA, Faries PL, Marin ML, Cho JS. A multicenter experience of the management of collapsed thoracic endografts. *J Vasc Surg* 2011;**53**(5):1217–22.